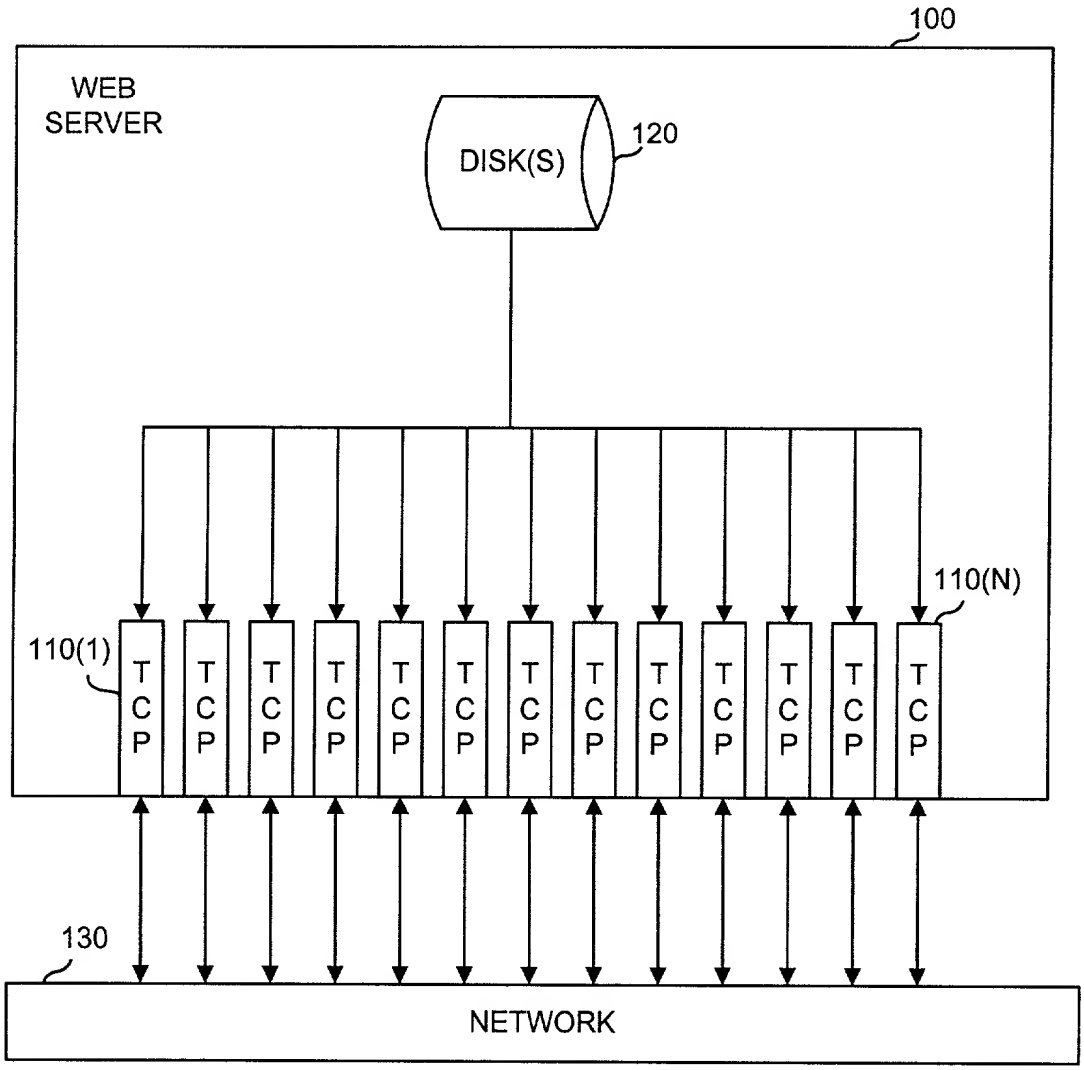

(Prior Art)

Figure 1

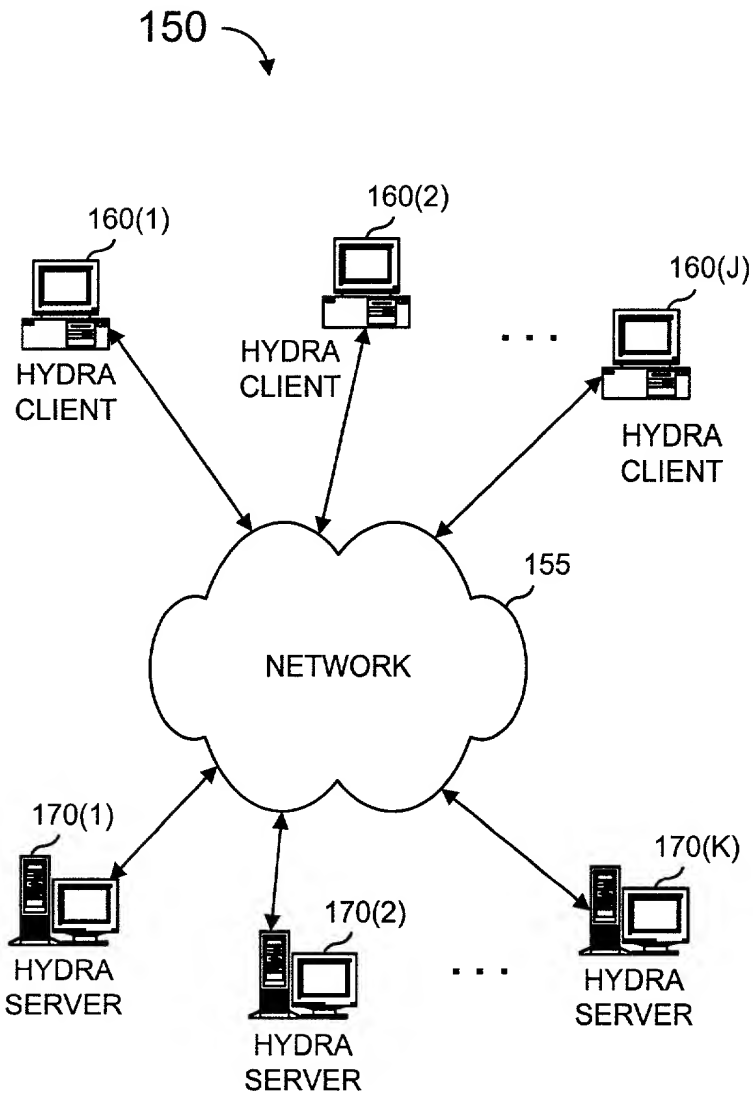
150
160(1)
HYDRA CLIENT
160(2)
HYDRA CLIENT
160(J)
HYDRA CLIENT
155
NETWORK
170(1)
HYDRA SERVER
170(2)
HYDRA SERVER
170(K)
HYDRA SERVER

Figure 2

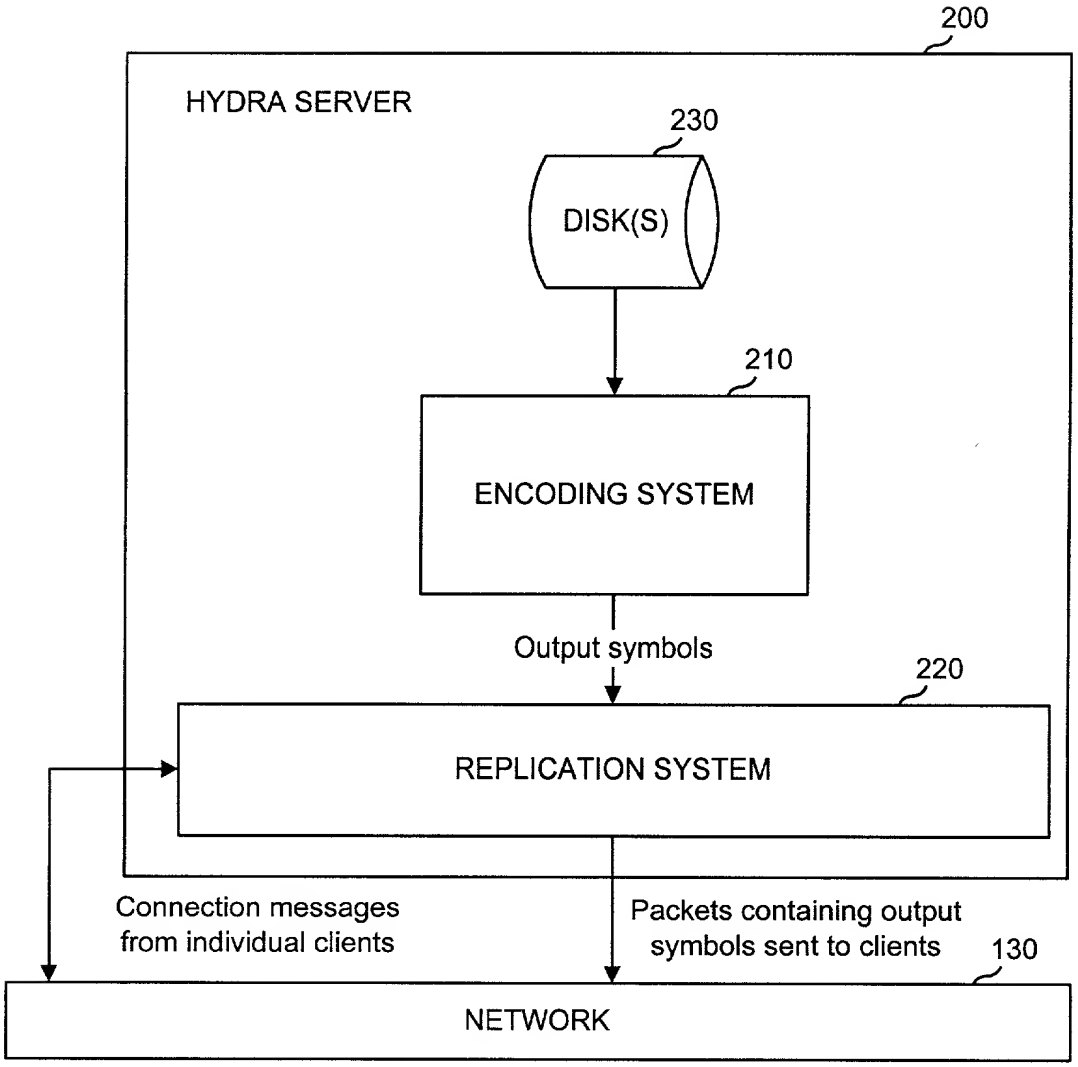
200
HYDRA SERVER
230
DISK(S)
210
ENCODING SYSTEM
Output symbols
220
REPLICATION SYSTEM
Connection messages from individual clients
Packets containing output symbols sent to clients
130
NETWORK

Figure 3A

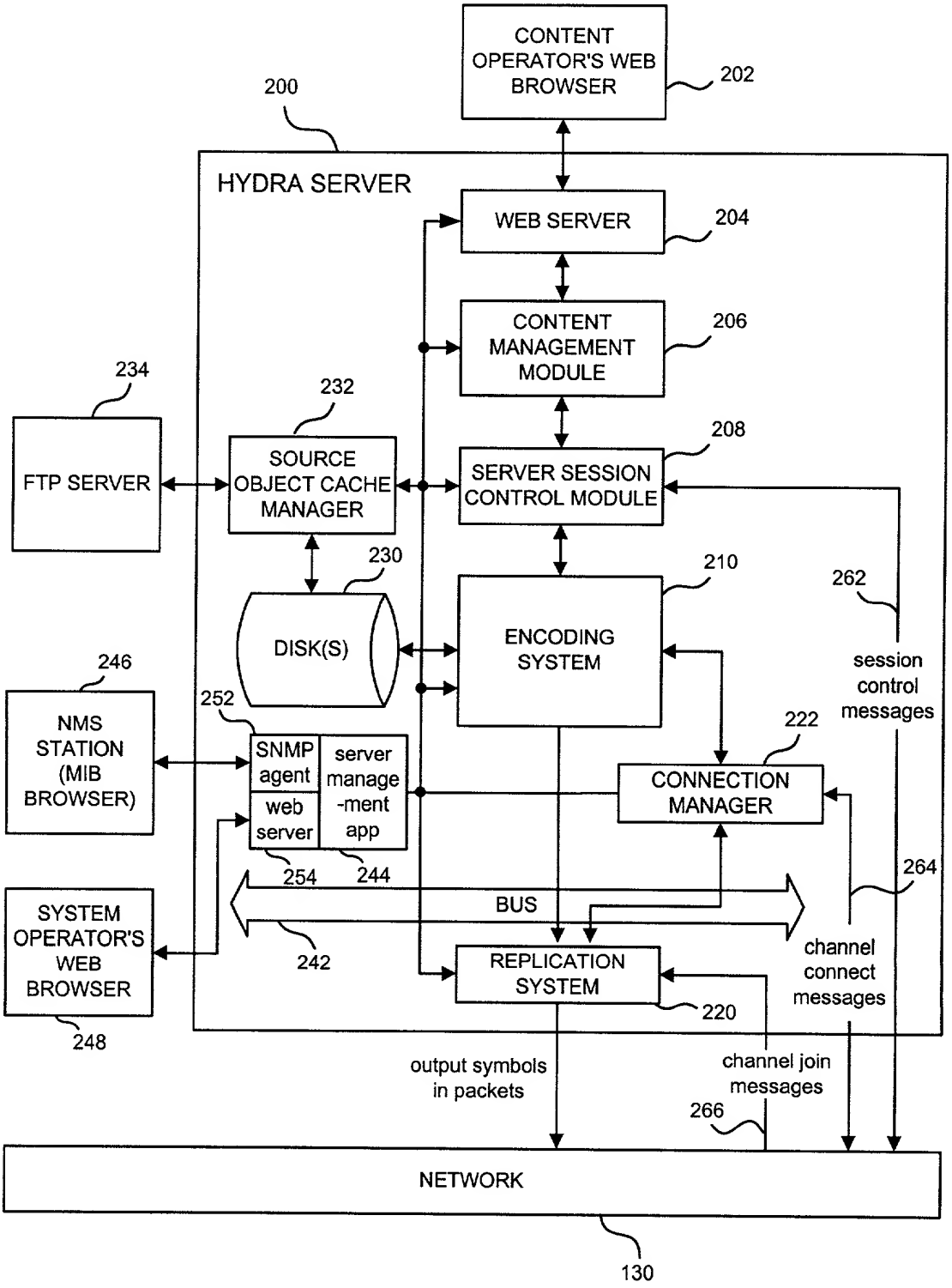
CONTENT OPERATOR'S WEB BROWSER
202
200
HYDRA SERVER
WEB SERVER
204
CONTENT MANAGEMENT MODULE
206
234
232
208
FTP SERVER
SOURCE OBJECT CACHE MANAGER
SERVER SESSION CONTROL MODULE
230
210
262
DISK(S)
ENCODING SYSTEM
session control messages
246
252
222
NMS STATION (MIB BROWSER)
SNMP agent
server manage -ment app
web server
CONNECTION MANAGER
254
244
264
BUS
SYSTEM OPERATOR'S WEB BROWSER
242
REPLICATION SYSTEM
channel connect messages
220
248
output symbols in packets
channel join messages
266
NETWORK
130

Figure 3B

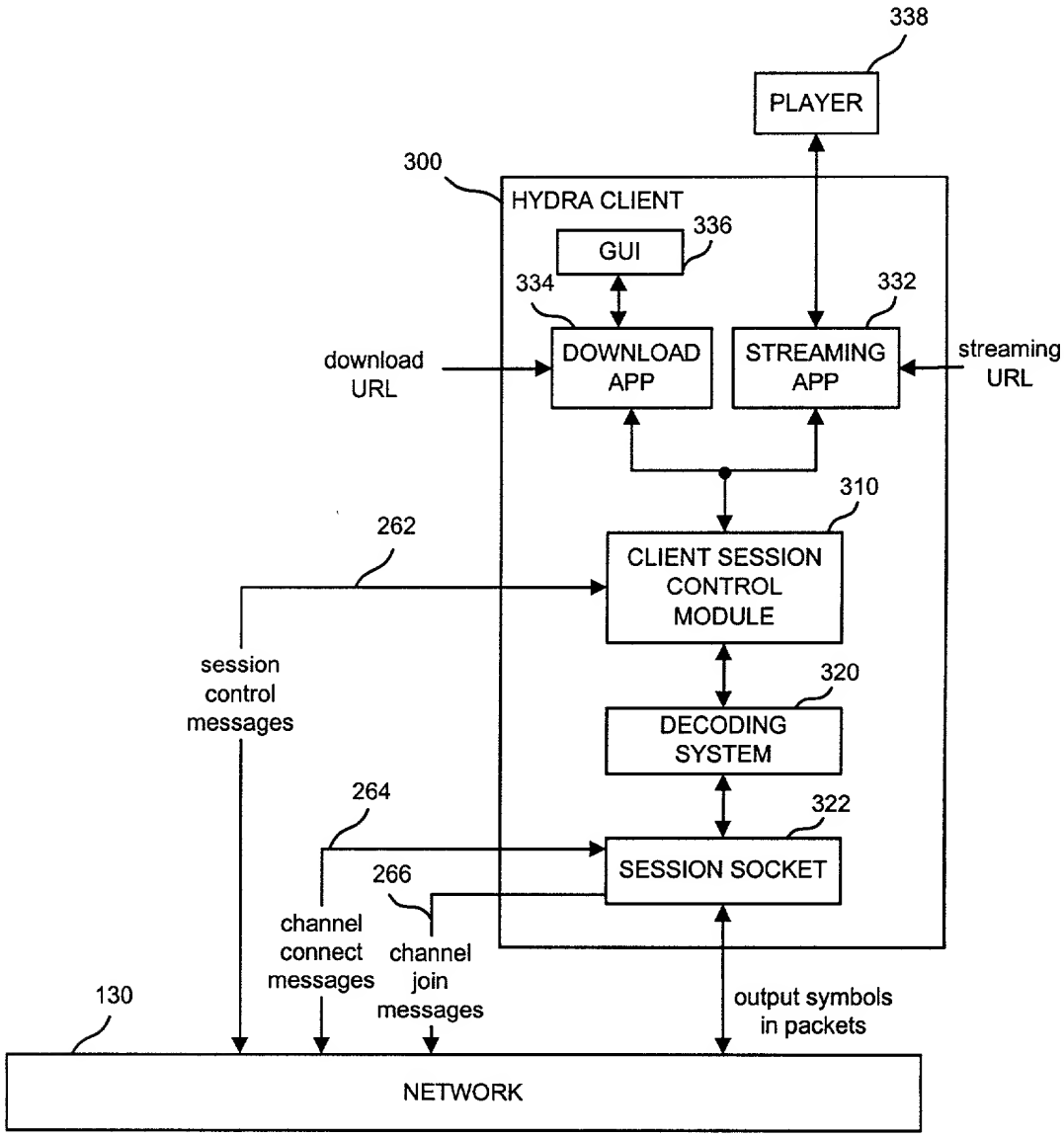
338
PLAYER
300
HYDRA CLIENT
336
GUI
334
332
download URL
DOWNLOAD APP
STREAMING APP
streaming URL
310
262
CLIENT SESSION CONTROL MODULE
session control messages
320
DECODING SYSTEM
264
322
SESSION SOCKET
266
channel connect messages
channel join messages
130
output symbols in packets
NETWORK

Figure 4

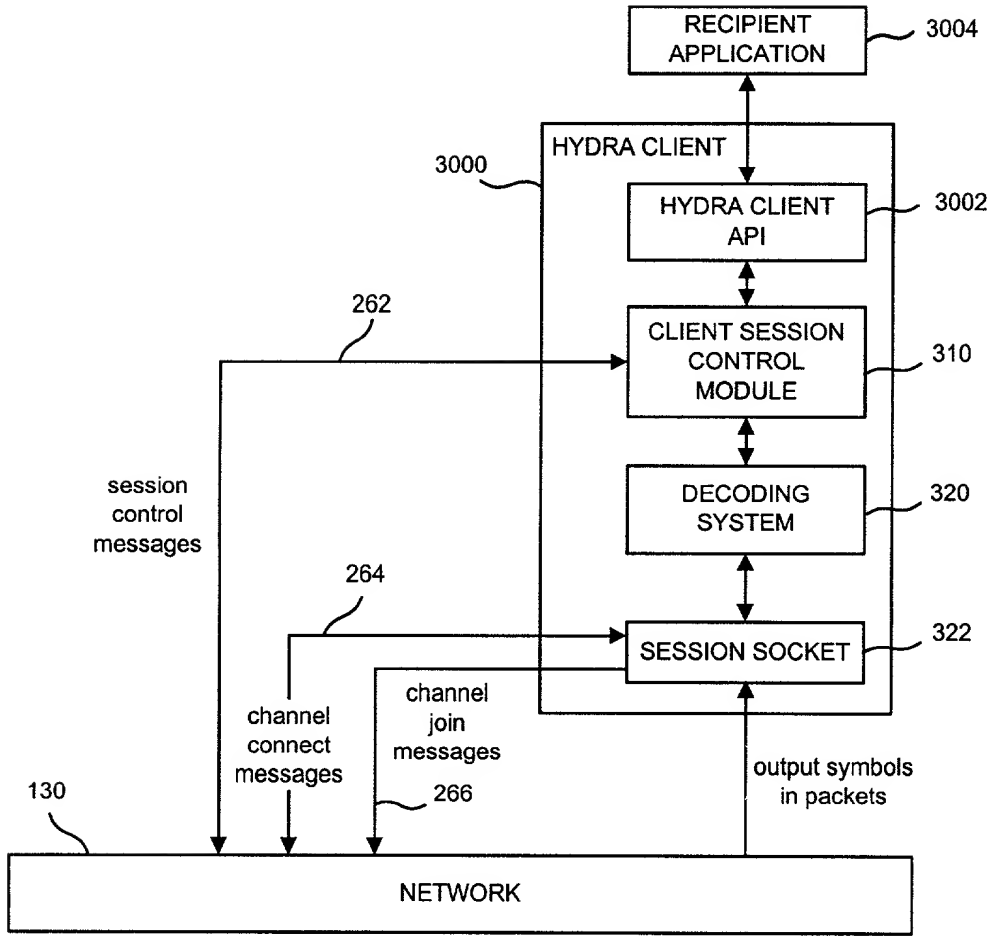
RECIPIENT APPLICATION
3004
HYDRA CLIENT
3000
HYDRA CLIENT API
3002
262
CLIENT SESSION CONTROL MODULE
310
DECODING SYSTEM
320
session control messages
264
SESSION SOCKET
322
channel connect messages
channel join messages
266
output symbols in packets
130
NETWORK

Figure 6

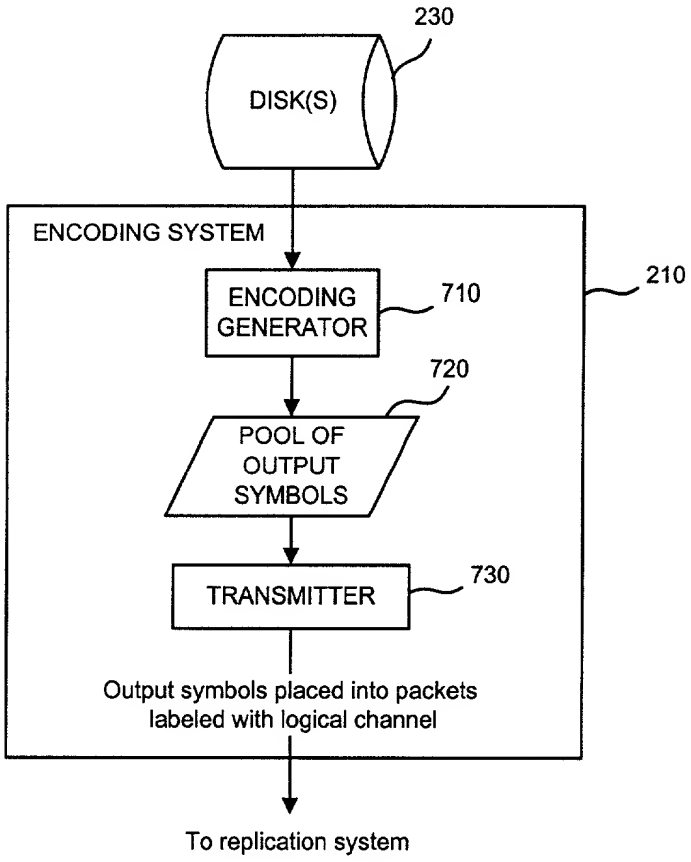
230
DISK(S)
ENCODING SYSTEM
210
ENCODING GENERATOR
710
720
POOL OF OUTPUT SYMBOLS
TRANSMITTER
730
Output symbols placed into packets labeled with logical channel
To replication system

Figure 7

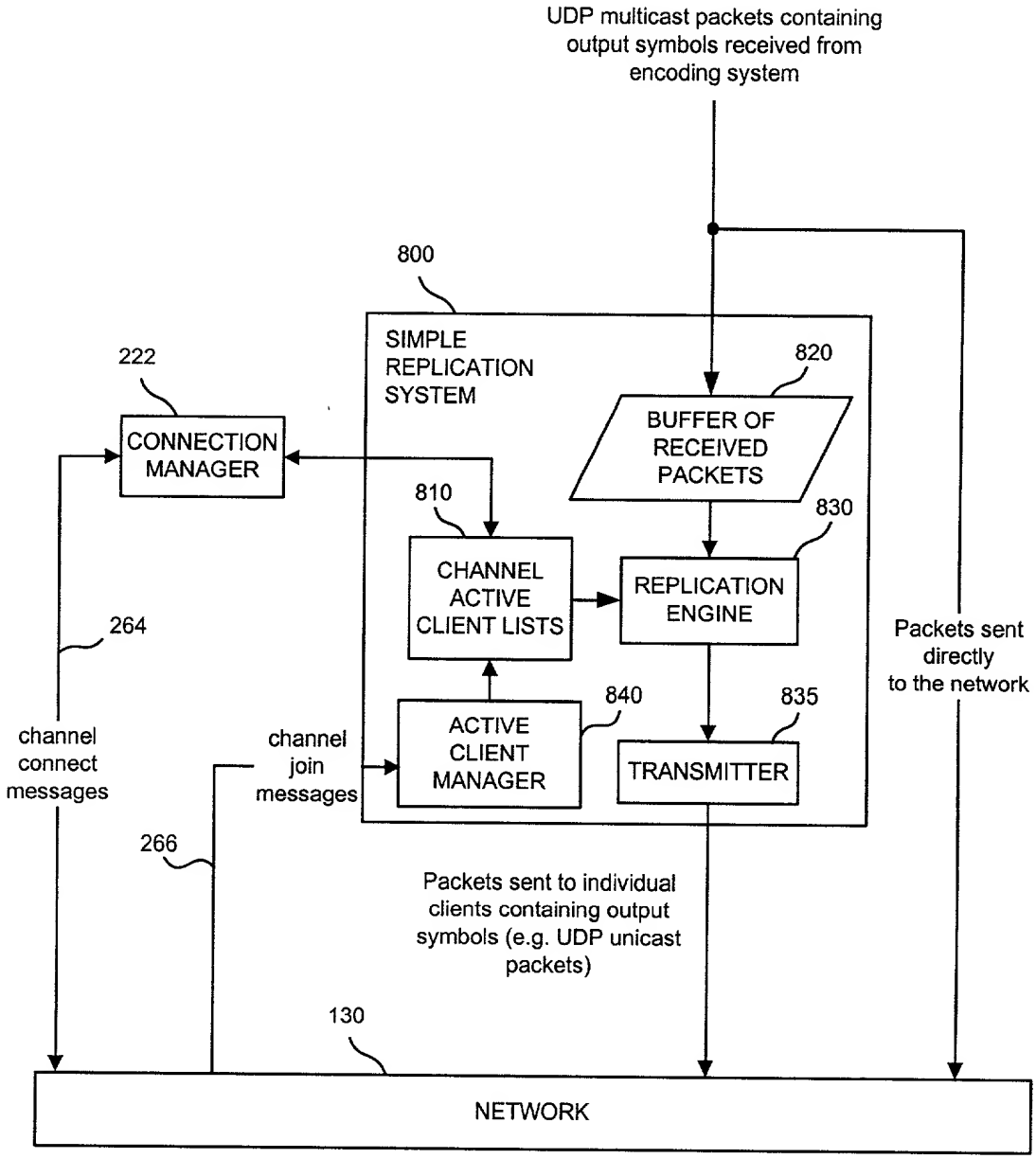
UDP multicast packets containing output symbols received from encoding system
800
SIMPLE REPLICATION SYSTEM
222
CONNECTION MANAGER
820
BUFFER OF RECEIVED PACKETS
810
CHANNEL ACTIVE CLIENT LISTS
830
REPLICATION ENGINE
264
channel connect messages
channel join messages
840
ACTIVE CLIENT MANAGER
835
TRANSMITTER
Packets sent directly to the network
266
Packets sent to individual clients containing output symbols (e.g. UDP unicast packets)
130
NETWORK

Figure 8

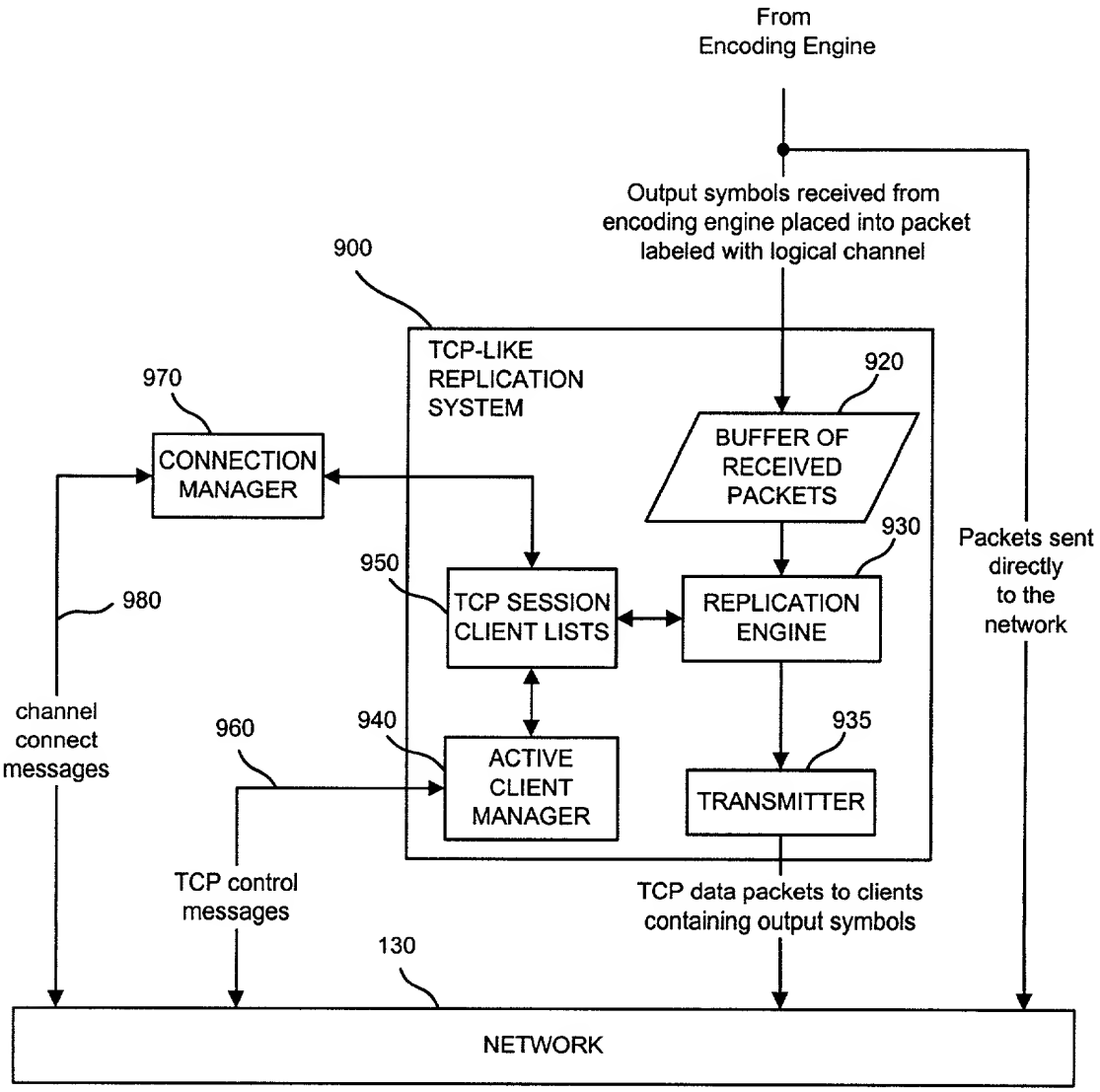
From
Encoding Engine
Output symbols received from
encoding engine placed into packet
labeled with logical channel
900
TCP-LIKE
REPLICATION
SYSTEM
970
CONNECTION
MANAGER
920
BUFFER OF
RECEIVED
PACKETS
930
950
TCP SESSION
CLIENT LISTS
REPLICATION
ENGINE
Packets sent
directly
to the
network
980
channel
connect
messages
960
940
ACTIVE
CLIENT
MANAGER
935
TRANSMITTER
TCP control
messages
TCP data packets to clients
containing output symbols
130
NETWORK

Figure 9

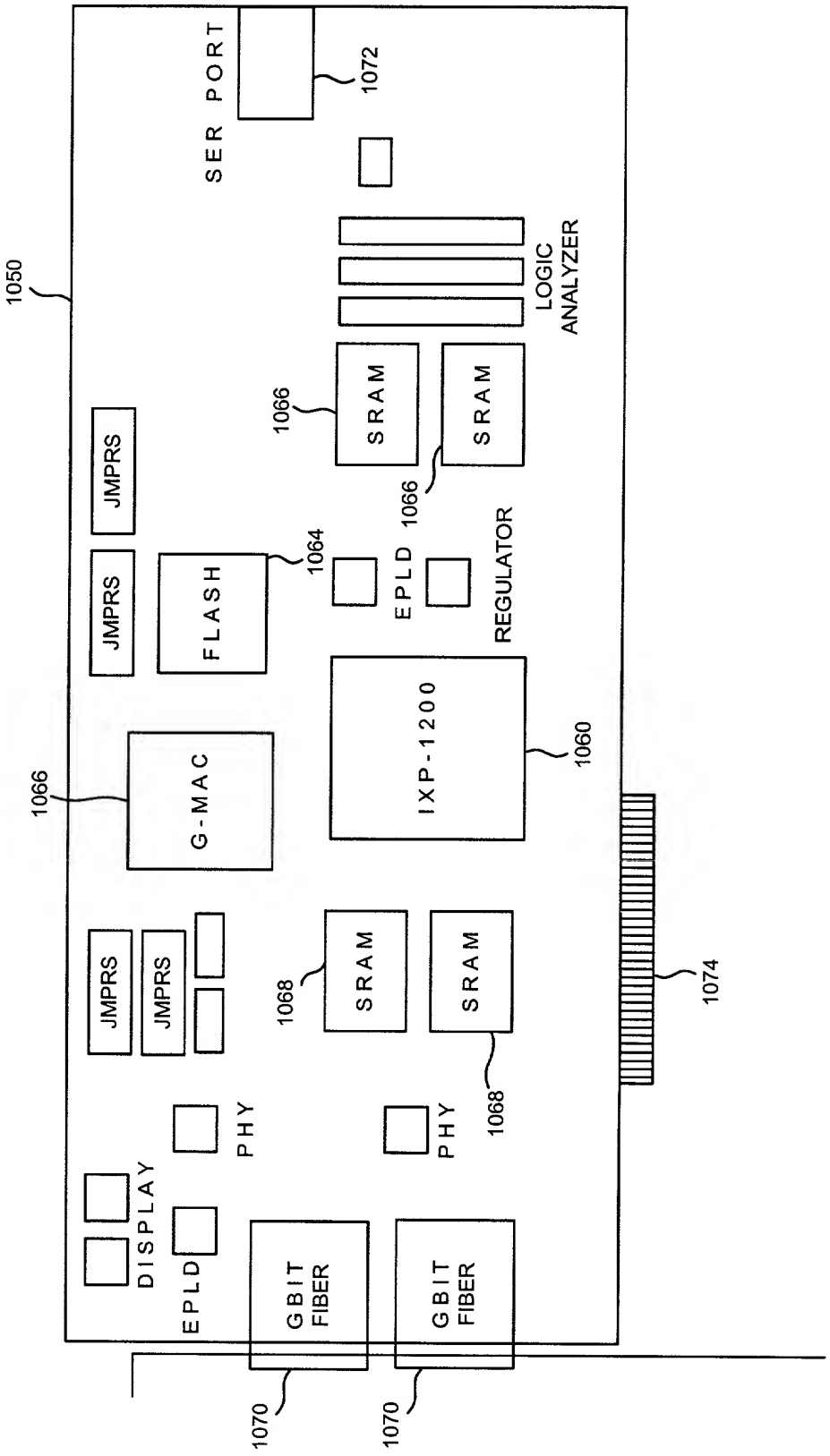
1050
SER PORT
1072
LOGIC ANALYZER
1066
SRAM
SRAM
1066
JMPRS
JMPRS
FLASH
1064
EPLD
REGULATOR
1066
G-MAC
IXP-1200
1060
JMPRS
JMPRS
1068
SRAM
SRAM
1068
1074
DISPLAY
EPLD
PHY
PHY
GBIT FIBER
GBIT FIBER
1070
1070

Figure 10A

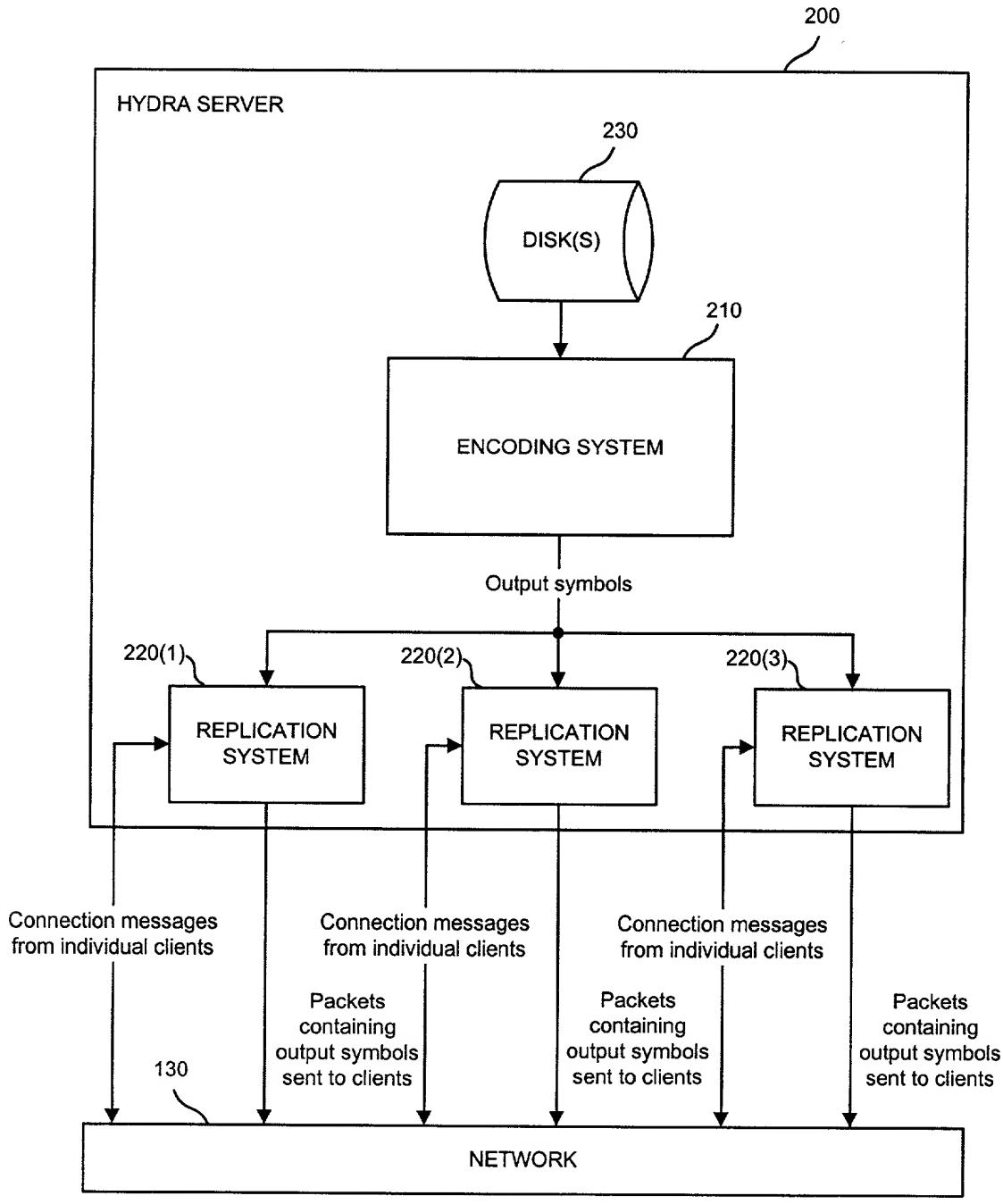
200
HYDRA SERVER
230
DISK(S)
210
ENCODING SYSTEM
Output symbols
220(1)
220(2)
220(3)
REPLICATION SYSTEM
REPLICATION SYSTEM
REPLICATION SYSTEM
Connection messages from individual clients
Connection messages from individual clients
Connection messages from individual clients
Packets containing output symbols sent to clients
Packets containing output symbols sent to clients
Packets containing output symbols sent to clients
130
NETWORK

Figure 10B

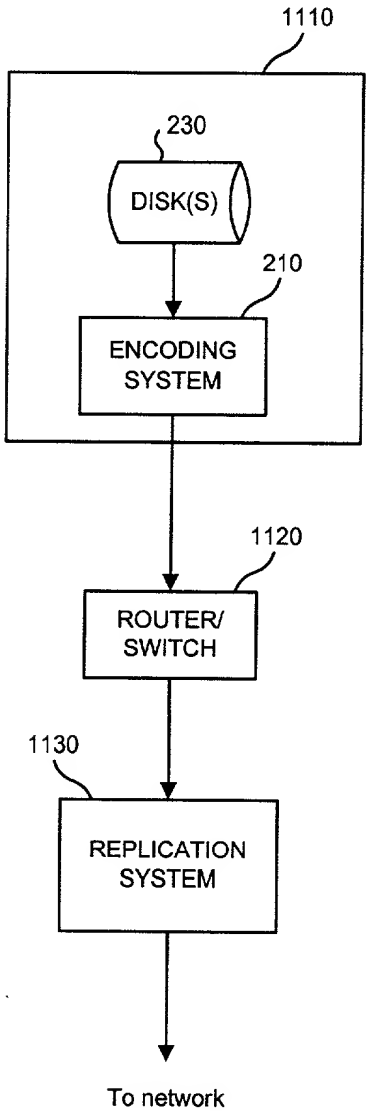
1110
230
DISK(S)
210
ENCODING SYSTEM
1120
ROUTER/ SWITCH
1130
REPLICATION SYSTEM
To network

Figure 11

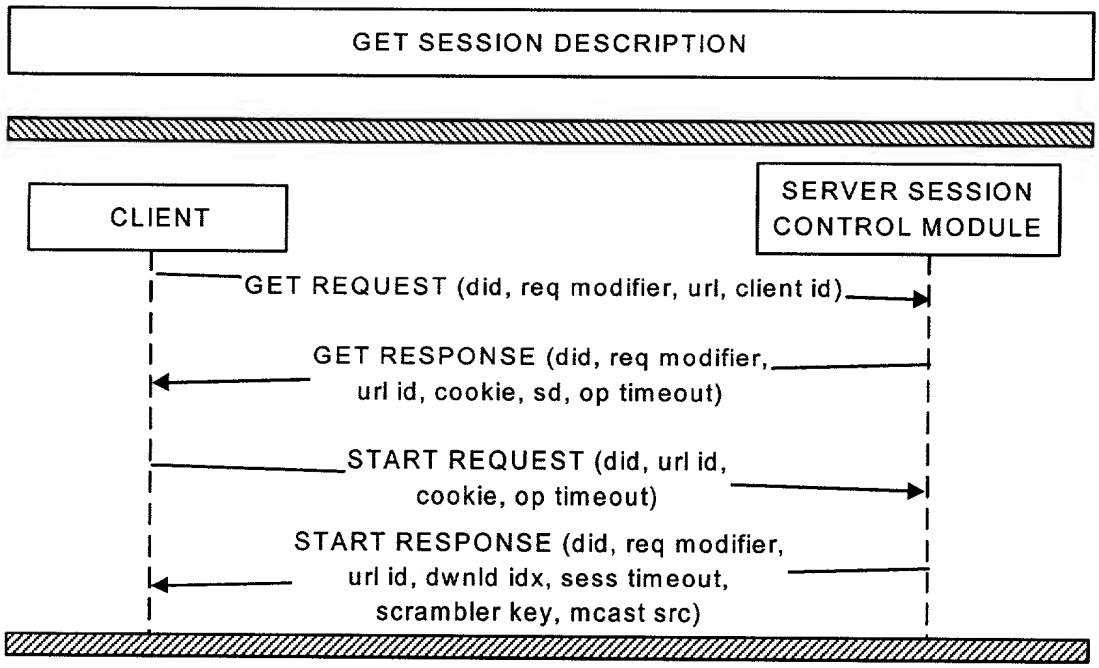
GET SESSION DESCRIPTION
CLIENT
SERVER SESSION CONTROL MODULE
GET REQUEST (did, req modifier, url, client id)
GET RESPONSE (did, req modifier, url id, cookie, sd, op timeout)
START REQUEST (did, url id, cookie, op timeout)
START RESPONSE (did, req modifier, url id, dwnld idx, sess timeout, scrambler key, mcast src)

Figure 13

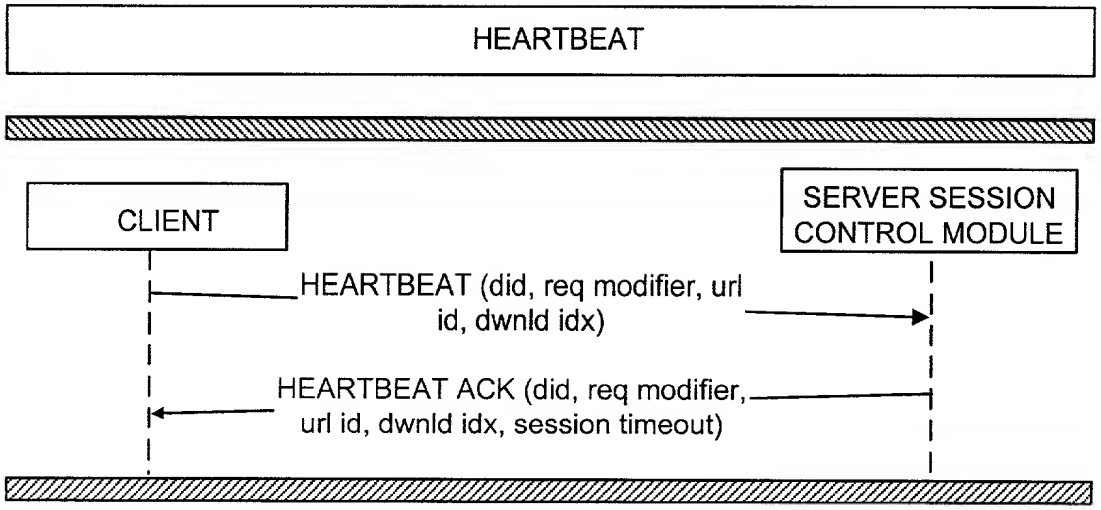
HEARTBEAT
CLIENT
SERVER SESSION CONTROL MODULE
HEARTBEAT (did, req modifier, url id, dwnld idx)
HEARTBEAT ACK (did, req modifier, url id, dwnld idx, session timeout)

Figure 14

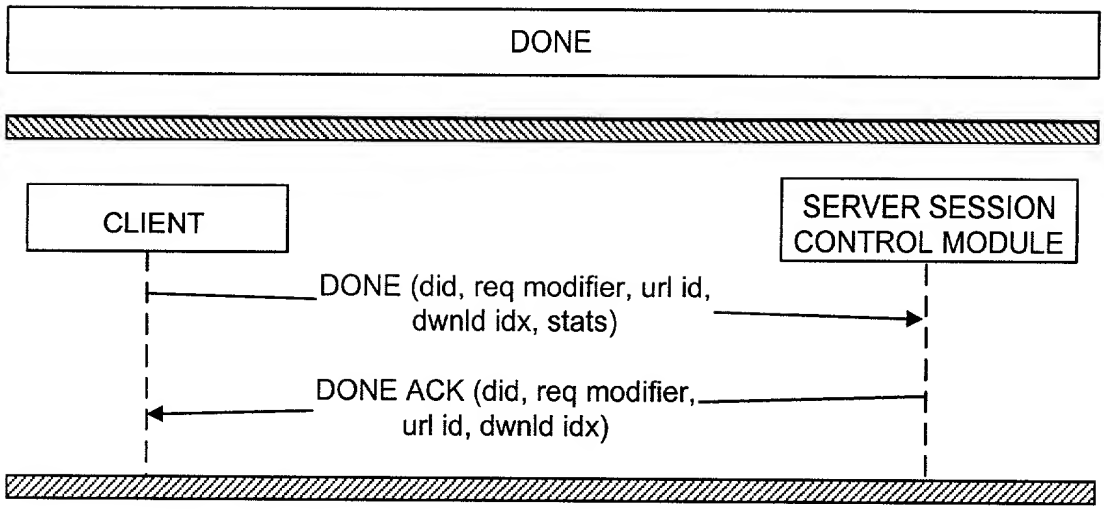
DONE
CLIENT
SERVER SESSION CONTROL MODULE
DONE (did, req modifier, url id, dwnld idx, stats)
DONE ACK (did, req modifier, url id, dwnld idx)

Figure 15

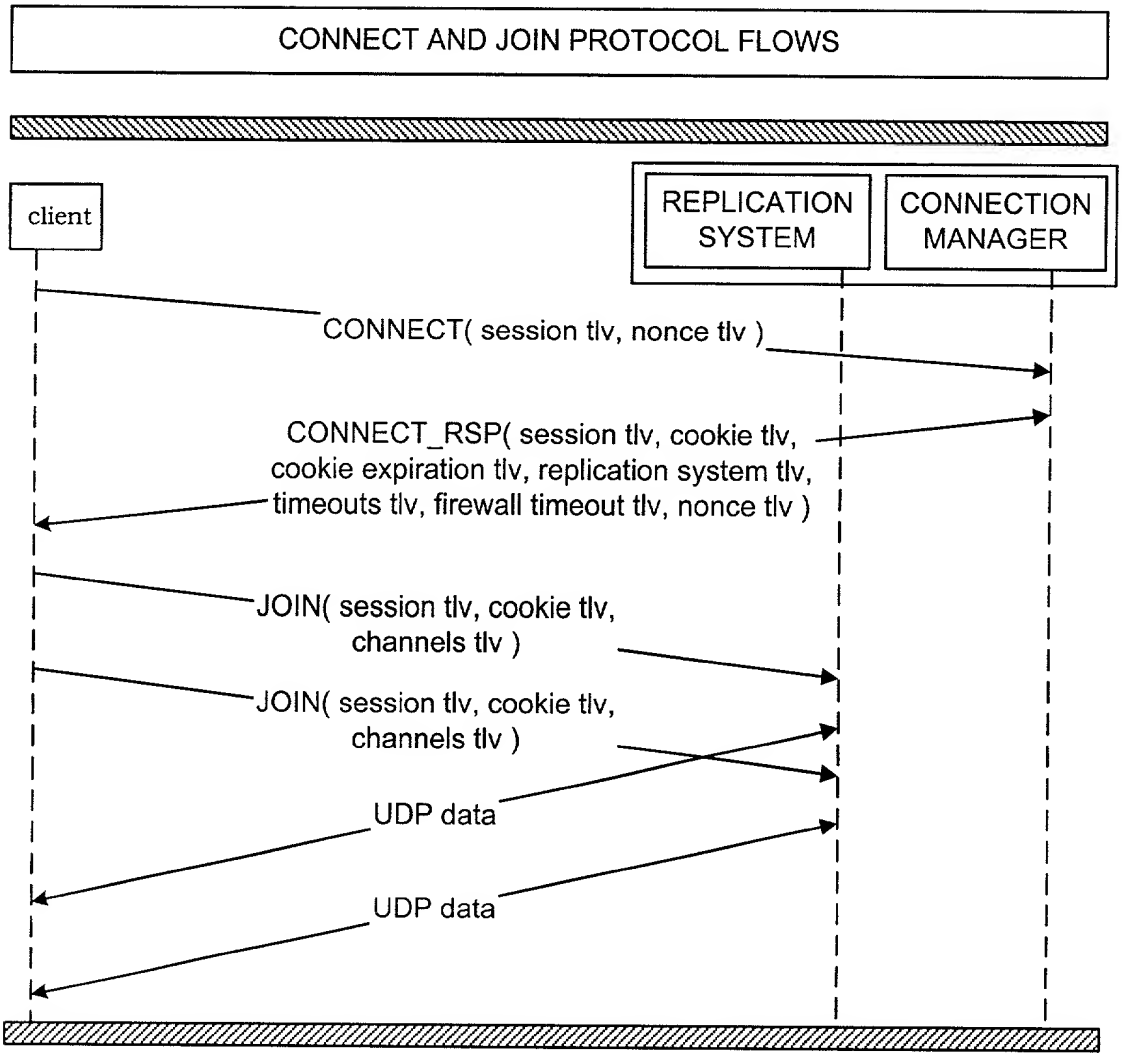
CONNECT AND JOIN PROTOCOL FLOWS
client
REPLICATION SYSTEM
CONNECTION MANAGER
CONNECT(session tlv, nonce tlv)
CONNECT_RSP(session tlv, cookie tlv, cookie expiration tlv, replication system tlv, timeouts tlv, firewall timeout tlv, nonce tlv)
JOIN(session tlv, cookie tlv, channels tlv)
JOIN(session tlv, cookie tlv, channels tlv)
UDP data
UDP data

Figure 16